REMARKS

Status of the Claims

Claims 1, 2, and 5-19 are pending, with claim 1 being independent. Claims 3 and 4 have been canceled without prejudice to or disclaimer of the subject matter contained therein. Claim 1 has been amended to even more clearly recite and distinctly claim the present invention. Support for the amendment to claim 1 may be found throughout the specification, including, for example, in the original claims and at page 8, lines 9-13. Therefore, no new matter has been added.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and following remarks.

Objection to Specification

The specification has been objected to because serial numbers are missing from the first paragraph on page 1 of the specification. The first paragraph of the specification has been amended to include the missing application serial numbers. Therefore, it is respectfully requested that this objection be withdrawn.

Presently Claimed Invention

The presently claimed invention relates to a method of removing contamination from a Fischer-Tropsch derived hydrocarbon stream. The presently claimed method comprises a) ***filtering*** a Fischer-Tropsch derived hydrocarbon stream to remove ***contamination having an average size greater than or equal to about 1 micron*** to produce a filtered hydrocarbon stream; b) passing ***the filtered hydrocarbon stream*** to at least one ***distillation step*** to remove contamination present as soluble species or as ultra-fine particulate from the filtered hydrocarbon stream, the distillation step producing a distillate product stream and a bottoms fraction, wherein the contamination is substantially concentrated in the bottoms fraction; and c) recovering the bottoms fraction from the distillation step, wherein the amount of the bottoms fraction is less than about 35 percent by volume of the filtered hydrocarbon stream. As disclosed in the specification, ultra-fine particulate are particles less than about 0.1 microns in size. (page 8, lines 9-11).

It has been discovered that filtering ***in combination with*** distillation can substantially reduce plugging of a hydroprocessing reactor. As such, the present specification discloses

that the distillation step following the filtration can substantially reduce plugging of a hydroprocessing reactor by removing contamination present as a soluble species or as ultra-fine particulate (meaning less than about 0.1 microns in size) since this contamination is not removed by conventional filtering. (page 8, lines 9-17).

Claim Rejections Under 35 U.S.C. § 103

Claims 1-19 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 4,605,678 ("Brennan") in view of U.S. Patent No. 6,635,682 ("Ketley"), U.S. Patent No. 2,852,546 ("Kolling"). Applicants respectfully disagree with the rejection; therefore, this rejection is respectfully traversed.

Brennan discloses a process for removing catalyst fines from the wax product produced in a slurry Fischer-Tropsch reactor comprising removing the wax product from the reactor and separating catalyst fines from the product by ***passing the wax product through a high gradient magnetic field.*** The catalyst fines are held by a magnetized filter element and the wax product passes through unhindered to form a purified wax product which is ready for upgrading. (Abstract). Brennan discloses that the wax product withdrawn from a slurry reactor contains catalyst fines entrained therein which need to be removed prior to upgrading the wax product. (Col. 8, line 67-Col. 9, line 2). Brennan further discloses that a portion of the catalyst fines are smaller than 1 micron in size, such that ordinary filtration is ineffective for their removal. (Col. 9, lines 2-6). To address this problem, Brennan discloses an improved process for removal of ***substantially all*** of these small catalyst fines comprising ***high gradient magnetic separation,*** and states that the disclosed separation system is remarkably efficient in removing these small catalyst particles. (Col. 10, lines 6-22 and lines 28-31).

Accordingly, Brennan discloses a process for removing particles smaller than 1 micron in size, which ordinary filtration is ineffective in removing, by passing the wax product through a high gradient magnetic field. As such, Brennan does not disclose or suggest removal of contamination present as soluble species or as ultra-fine particulate (i.e., having an average size less than about 0.1 micron) by passing a filtered hydrocarbon stream to at least one distillation step.

Ketley discloses a process for the conversion of synthesis gas into higher hydrocarbon products in a system comprising a high shear mixing zone and a post mixing zone. (Abstract).

Ketley discloses that "a portion of the suspension is withdrawn from the system and by a suitable separation means, e.g. a hydrocyclone, filter, gravity separator or magnetic separator, or alternatively, by distillation, the liquid medium and liquid hydrocarbon products may be separated from the suspended catalyst." (Col. 9, lines 5-14). Accordingly, Ketley does not disclose or suggest to specifically select distillation, as it is disclosed as one of various separation techniques. Ketley lists all of the disclosed separation techniques as ***interchangeable*** without making any distinction among the various separation techniques. Moreover, Ketley does not disclose or suggest the problem of removal of catalysts particles of varying different sizes or removal of catalyst particles smaller than 1 micron in size, which ordinary filtration is ineffective in removing,

Kolling discloses a process for converting hard paraffins into paraffins preferably melting between about 40 and 80°C. (Col. 2, lines 7-9). As disclosed in the present specification, Kolling describes an atmospheric distillation followed by a vacuum distillation of a Fischer-Tropsch wax to separate paraffins with melting points between 40 and 80°C. (page 16, line 31 – page 17, line 2). Accordingly, Kolling discloses an atmospheric distillation followed by a vacuum distillation as a separation technique ***to provide desired Fischer-Tropsch products***, not to remove contamination.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP § 2143.

It is respectfully submitted that even if there were some suggestion or motivation to combine Brennan with Ketley and/or Kolling and a reasonable expectation of success, even if combined Brennan and Ketley and/or Kolling do not disclose or suggest all of the claim limitations of the presently claimed method for removing contamination from a Fischer-Tropsch derived hydrocarbon stream.

As described above, Brennan discloses a process for removing particles smaller than 1 micron in size, which ordinary filtration is ineffective in removing, by passing the wax product through a ***high gradient magnetic field***. Also as described above, Ketley provides that the suspension withdrawn from the disclosed system is subjected to a suitable separation

means, e.g. a hydrocyclone, filter, gravity separator or magnetic separator, or alternatively, by distillation, without making any distinction or providing any basis on which to select among the various separation techniques. Kolling discloses an atmospheric distillation followed by a vacuum distillation as a separation technique ***to provide desired Fischer-Tropsch products***.

Accordingly, even if Brennan were combined with Ketley and Kolling, the wax product would be passed through a ***high gradient magnetic field*** to remove the small catalyst particles (i.e., particles smaller than 1 micron in size that ordinary filtration is ineffective in removing). Therefore, even if combined Brennan and Ketley and/or Kolling do not disclose or suggest a method of removing contamination from a Fischer-Tropsch derived hydrocarbon stream comprising a) ***filtering*** a Fischer-Tropsch derived hydrocarbon stream to remove ***contamination having an average size greater than or equal to about 1 micron*** to produce a filtered hydrocarbon stream; b) passing ***the filtered hydrocarbon stream*** to at least one ***distillation step*** to remove contamination present as soluble species or as ultra-fine particulate from the filtered hydrocarbon stream, the distillation step producing a distillate product stream and a bottoms fraction, wherein the contamination is substantially concentrated in the bottoms fraction; and c) recovering the bottoms fraction from the distillation step, wherein the amount of the bottoms fraction is less than about 35 percent by volume of the filtered hydrocarbon stream.

In addition, it is respectfully submitted that there is no suggestion or motivation to combine Brennan with Ketley and Kolling.

As described above, Brennan discloses ***removing particles smaller than 1 micron*** in size, which ***ordinary filtration is ineffective*** in removing, by passing the wax product through a ***high gradient magnetic field***. Brennan states that the disclosed separation system is ***remarkably efficient*** in removing substantially all of these small catalyst fines. Also as described above, Ketley discloses ***various suitable separation*** means, e.g. a hydrocyclone, filter, gravity separator or magnetic separator, or alternatively, by distillation. Ketley does not disclose or suggest the problem of removal of catalysts particles of varying different sizes or removal of catalyst particles smaller than 1 micron in size, which ordinary filtration is ineffective in removing, which problem Brennan states to have successfully addressed. Kolling discloses an atmospheric distillation followed by a vacuum distillation as a separation technique ***to provide desired Fischer-Tropsch products***.

Accordingly, since the disclosed separation system of Brennan is stated to be remarkably efficient in removing small catalyst particles smaller than 1 micron in size, which ordinary filtration is ineffective in removing, there is no suggestion or motivation to combine the separation system of Brennan with any of the techniques disclosed in Ketley or Kolling in an attempt to obtain the process of the present invention. The Office Action has merely attempted to abstract individual teachings from the different pieces of prior art to create the combination upon which the rejection of the present claims is based. This is an error as a matter of law. W.L. Gore & Associates v. Garlock, Inc., 721 F.2d 1540, 1552, 220 USPQ 303, 312 (Fed. Cir. 1983).

Moreover, it is respectfully submitted there is no reasonable expectation of success in combining the separation techniques of Brennan with Ketley or Kolling. Brennan states that the disclosed separation system using a ***high gradient magnetic field*** is ***remarkably efficient*** in removing substantially all of the catalyst ***particles smaller than 1 micron*** in size, which ***ordinary filtration is ineffective*** in removing. Thus, there is no reasonable expectation of success in combining the separation techniques of Brennan with Ketley or Kolling. Therefore, without an expectation of success in combining features of Brennan with Ketley and/or Kolling, such a combination is improper and results in impermissible hindsight.

For at least the above described reasons, withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

Conclusion

Without conceding the propriety of the rejections, the claims have been amended, as provided above, to even more clearly recite and distinctly claim Applicants' invention and to pursue an early allowance. For the reasons noted above, the art of record does not disclose or suggest the inventive concept of the present invention as defined by the claims.

In view of the foregoing amendments and remarks, reconsideration of the claims and allowance of the subject application is earnestly solicited. In the event that there are any questions relating to this application, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that prosecution of this application may be expedited.

In the event any further fees are due to maintain pendency of this application, the Examiner is authorized to charge such fees to Deposit Account No. 02-4800.

Respectfully submitted,

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